

## CLAIMS

1. A method, for use on a LAN wherein a plurality of stations are physically connected to a shared transmission medium and operate according to a collision protocol, for  
5 providing a collision-free protocol that operates concurrently with the collision protocol, the method comprising the steps of:

forming a logical ring among a subset of the plurality of stations physically connected to the shared transmission medium;

circulating a token among stations of the logical ring;

transmitting, according to the collision protocol, from a first station that is a member of the logical ring, only while the first station holds the token; and

15 transmitting, according to the collision protocol but without regard for the token, from a second station that is physically connected to the shared transmission medium but not a member of the logical ring.

20 2. A method over a collision LAN that comprises a plurality of stations physically connected over a shared transmission medium, for enabling a collision-free protocol for concurrently transmitting frames between all or part of the plurality of stations, the method comprising the steps of:

forming a logical ring among all or part of the plurality of stations;

circulating a token between stations of the logical ring;

transmitting from any one station that is part of the  
5 logical ring only while holding the token, to prevent collisions from happening upon transmitting over the shared transmission medium.

3. The method of claim 2, wherein the shared transmission medium complies with IEEE Standard 802.3.

4. The method of claim 2, wherein each station of the logical ring includes a collision-control sublayer that comprises a transmit queue.

5. The method according to claim 2, wherein said transmitting step includes, in said any one station part of said  
15 logical ring, the further steps of:

checking whether said any one station holds said token or not;

if not, keep waiting until said token is received;

if holding said token, checking if said transmit queue is empty;

if empty, skipping following placing step;

if not empty, placing a first or only frame from said  
5 transmit queue on said shared medium, thus transmitting said frame;

retrieving an ID of an immediate next station in sequence in said logical ring;

forwarding said token to said immediate next station; and  
10 resuming to first checking step to wait for a next occurrence of said token.

6. The method according to claim 2 wherein said forming step includes, in a station wishing to join said logical ring, the further steps of:

15 upon starting insertion of said joining station,

issuing a RIR (Ring Insert Request) message towards an assumed RM (Ring Manager);

starting a RIT (Ring Insert Timer);

checking whether a RIG (Ring Insert Granted) message is  
20 received or not;

if said RIG is received, inserting said joining station  
in said logical ring to complete said insertion of said  
joining station in said logical ring;

if said RIG is not received, checking whether a RID (Ring  
5 Insert Denied) message is received,

if said RID is received, restarting insertion of said  
joining station;

if said RID is not received, checking whether said RIT  
has elapsed;

if said RIT has not elapsed, resuming at checking RIG  
step;

if said RIT has elapsed, issuing said RID message, self-  
electing said joining station to play the role of RM.

7. The method according to claim 6 wherein said RM,  
15 upon issuing said RIG message towards said joining station,  
also issues a RIU (Ring Insert Update) message to an immediate  
previous station over said logical ring.

8. The method according to claim 6 wherein said forming  
step includes, in a station wishing to leave said logical  
20 ring, the further steps of:

upon starting removal of said leaving station, checking whether said leaving station is said RM or not;

if not, skipping the following setting step;

if said leaving station is said RM, setting a flag in a  
5 RRF (Ring Removal Forward) message;

issuing said RRF to said immediate next station of said logical ring; and

issuing a RFB (Ring Removal Backward) message to said immediate previous station of said logical ring.

10 9. The method according to claim 5 wherein said step of checking whether said any one station holds said token or not includes the further steps of:

checking whether said token has been received;

15 if said token has been received, resetting a RTT (Ring Token Timer and keep cycling;

if said token has not been received, checking whether said RTT has elapsed or not;

if said RTT has not elapsed, keep cycling;

20 if said RTT has elapsed, issuing a RR (Ring Restart) message to inform all stations of said logical ring to restart insertion.